ORDER NO. RD7703-1452

Service Manual

Radio

FM-AM-SW1~6 8-BAND
PORTABLE RADIO

RF-2200BS Ⓐ

■ SPECIFICATIONS

Frequency Range:	FM 87.5~108 MHz		SW5 0.3μV for 50 mW Output
	MW 525~1610 kHz (571~186m)		SW6 0.3μV for 50 mW Output
	SW1 3.9~8 MHz (76.9~37.5m)	Power Output:	3W (DC Max.)
	SW2 8~12 MHz (37.5~25m)		2.4W (MPO)
	SW3 12~16 MHz (25~18.8m)	Power Source:	AC 110—125/220—240V 50/60 Hz or
	SW4 16~20 MHz (18.8~15m)		6V (Four "D" Size Flashlight
	SW5 20~24 MHz (15~12.5m)		Batteries)
	SW6 24~28 MHz (12.5~10.7m)		(Panasonic UM-1 or equivalent)
Intermediate Frequency:	FM 10.7 MHz	Power Consumption:	7W (AC Only)
	MW & SW 2nd 455 kHz	Speaker:	10 cm (4") PM Dynamic Speaker
	SW 1st 1.985 MHz	Dimensions:	$12\frac{17}{32}$"(Wide) × $7\frac{13}{32}$"(High) ×
Sensitivity:	FM 2μV (S/N 6 dB)/50 mW Output		$3\frac{15}{16}$" (Deep)
	MW 14μV/m for 50 mW Output		(318 × 188 × 100 mm)
	SW1 0.5μV for 50 mW Output	Weight:	3 kg (6 lb. 9.8 oz.) without batteries
	SW2 0.5μV for 50 mW Output	Impedance:	Speaker 8Ω
	SW3 0.5μV for 50 mW Output		Earphone Jack 8Ω
	SW4 0.5μV for 50 mW Output		Recording Out Jack 3kΩ

Specifications are subject to change without notice for further improvement.

National Panasonic

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka, Japan

■ TO REMOVE FRONT AND REAR COVER

1. Set dial scale to minimum frequency.
2. Remove the ten (10) knobs for the FM AFC, X-TAL MARKER, VOLUME, BASS, TREBLE, TUNING SPEED, BAND and MW/SW RF GAIN.
3. Lift up the gyro antenna.
4. Remove the battery cover and pull out the batteries.
5. Remove the six (6) screws for the cabinet cover, as shown in fig. 1.
6. Remove the rear cover.
7. Remove the sockets from chassis.
8. Push the catch in the direction of arrow, as shown in fig. 2 and remove the front cover.
9. Remove the sockets from chassis.
0. To reassemble, reverse the above procedure and note the following.
   1. Set power and AFC switch to "ON" position.
   2. Set X-TAL marker and BFO switch to "OFF" positions.

■ TO REMOVE DIAL DRIVE ASSEMBLY

1. Set band switch to "SW-SW$_1$" position.
2. Remove the cabinet covers. (Refer to cabinet cover removal instruction.)
3. Remove the four (4) screws (nos. 1~4) for the dial drive assembly, as shown in fig. 3.
4. Turn the tuning shaft to clockwise and set the two (2) screws at the position, as shown in fig. 4.
5. Loosen the one (1) screw (no. 2) for the variable capacitor shaft, as shown in fig. 4.
6. Turn tuning shaft fully counter-clockwise.
7. Loosen the one (1) screw (no. 1) for the variable capacitor shaft, as shown in fig. 4.
8. Remove the tuning knob.
9. Push the catch in the direction of arrow ① and remove the front panel in the direction of arrow ②, as shown in fig. 5.
10. Remove the six (6) screws (nos. 1~6) for the dial drive assembly, as shown in fig. 6.
11. Remove the dial drive assembly.
12. To reassemble, reverse the above procedure and note the following.
    1. Set the band switch shaft at the position (SW, SW$_1$), as shown in fig. 7.
    2. Set the band switch shaft of dial drive assembly at the position, as shown in fig. 8.
    3. Set the "0" point of dial scale to pointer of front panel, as shown in fig. 8.
    4. Set tuning capacitor to maximum capacity.
    5. Insert the dial drive assembly in chassis.
    6. Turn the shaft of band selector drum with a pliers and set the indicator of band selector drum to "SW$_1$" position, as shown in fig. 8.

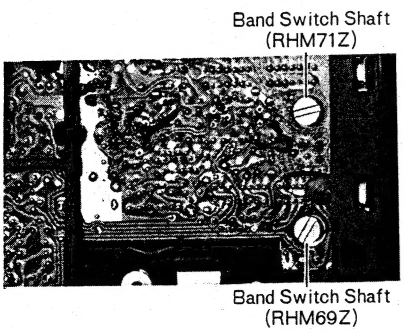


Fig. 7

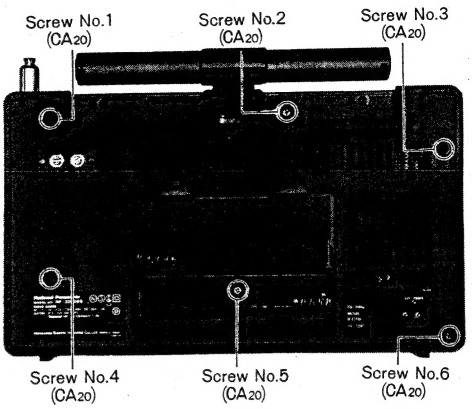


Fig. 1

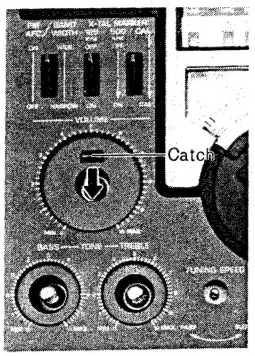


Fig. 2

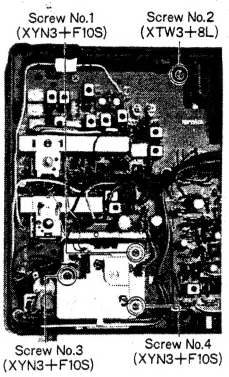


Fig. 3

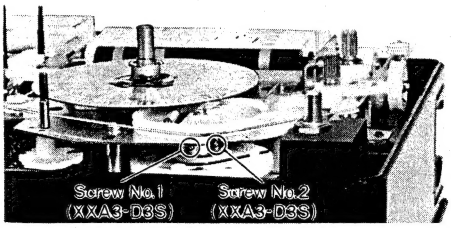


Fig. 4

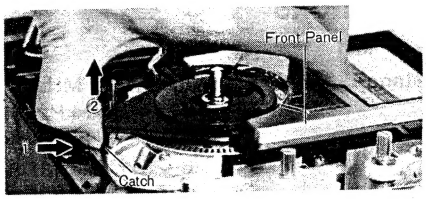


Fig. 5

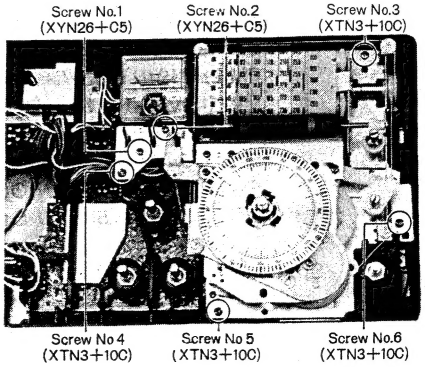


Fig. 6

■ DIAL CORD INSTALLATION GUIDE

1. Remove dial drive assembly. (Refer to dial drive assembly removal instruction.)
2. Remove spread dial.
3. Loosen the one (1) screw for the drum shaft, as shown in fig. 8.
4. Set the dial drum at the position, as shown in fig. 9.
5. Turn tuning shaft fully counter-clockwise.
6. Cord length is 100 cm ($39\frac{3}{8}$").
7. Arrows (1~12) indicate correct order and direction of dial cord installation, as shown in fig. 9.
8. Cement dial cord ends.
9. Set the "0" point of dial scale to pointer of front panel. (Refer to dial scale mounting instruction.)

■ TO MOUNT DIAL SCALE

1. Remove the front cover. (Refer to cabinet cover removal instruction.)
2. Remove the front panel. (Refer to dial drive assembly removal instruction.)
3. Loosen the one (1) screw for the drum shaft, as shown in fig. 10.
4. When removed the rollers, set the roller no. 1 and 2 at the position, as shown in fig. 11.
5. Wind the dial scale onto roller no. 2 shown in fig. 10 and secure the gear of roller no. 2. Hook the dial scale on the catch of roller no. 1, as shown in fig. 10.
6. Mount the front panel to chassis.
7. Turn the tuning shaft fully counter-clockwise.
8. Turn the roller gear, shown in fig. 12 and set the "0" point of dial scale to the pointer of front panel, as shown in fig. 8. Tighten the one (1) screw for the drum shaft, as shown in fig. 8.

■ TO REMOVE POWER, LIGHT AND BFO SWITCH

1. Remove the cabinet covers. (Refer to cabinet cover removal instruction.)
2. Push the four (4) catches in the direction of arrow shown in fig. 13 and remove the switch.
3. To reassemble, reverse the above procedure.

■ TO REMOVE BASS, TREBLE, VOLUME AND RF GAIN CONTROL

1. Remove the cabinet covers. (Refer to cabinet cover removal instruction.)
2. Remove the dial drive assembly. (Refer to dial drive assembly removal instruction.)
3. Set variable capacitor to maximum capacity.
4. Unsolder the lead wire of RF gain control from chassis.
5. Remove the meter and dial lamp.
6. Remove the power, light and BFO switch. (Refer to switch removal instruction.)
7. Remove the FM AFC and X-TAL marker switch.
8. Remove the three (3) red screws (nos. 1~3) for the PC board, as shown in fig. 14.
9. Remove the two (2) screws (nos. 4 & 5) for the lead wires, as shown in fig. 14.
10. Remove the four (4) nuts (nos. 1, 3, 4 & 5) for the controls, as shown in fig. 15.
11. Remove the one (1) screw (no. 2) for sub PC board, shown in fig. 15 and remove sub PC board.
12. Push the eight (8) catches for the PC board, shown in fig. 15 and remove PC board.
13. Unsolder the controls, as shown in fig. 16.

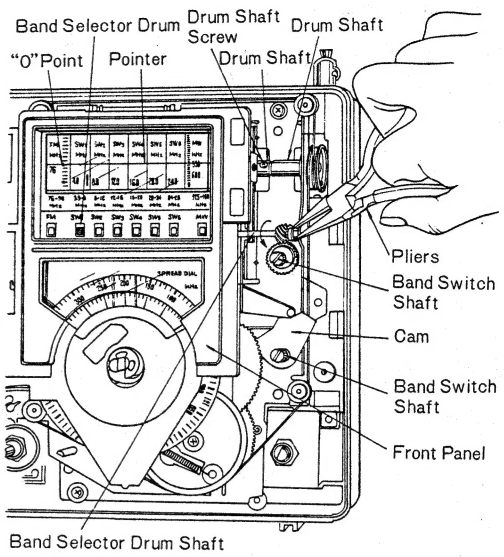


Fig. 8

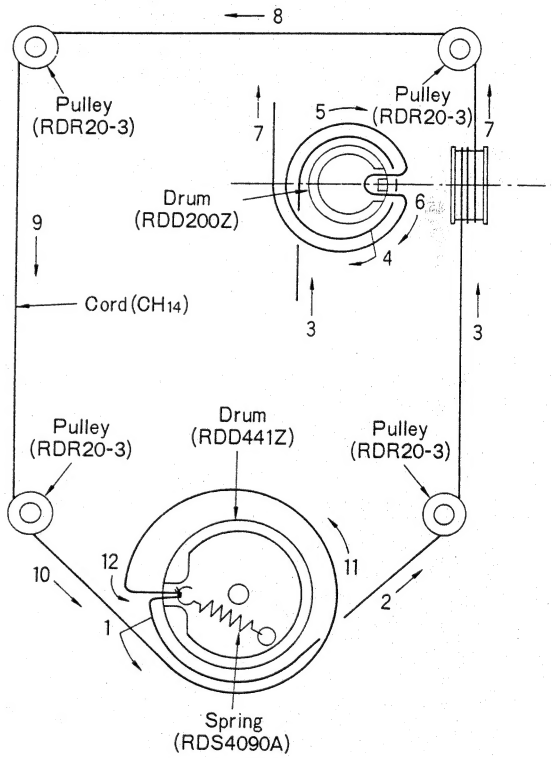


Fig. 9

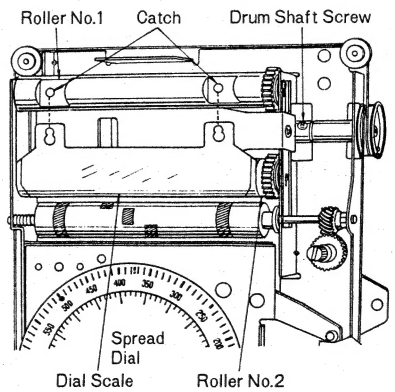


Fig. 10

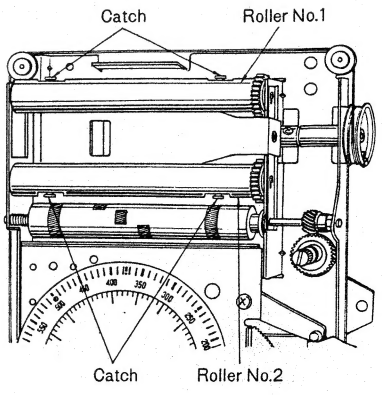


Fig. 11

■ TO REMOVE GYRO ANTENNA CASE ASSEMBLY

1. Remove the rear cover. (Refer to cabinet cover removal instruction.)
2. Unsolder the lead wire of gyro antenna from PC board.
3. Remove the circlip in the direction of arrow, as shown in fig. 17.
4. Remove the gyro antenna case.
5. To reassemble, reverse the above procedure.

■ TO REMOVE CORE ANTENNA

1. Remove the gyro antenna cover in the direction of arrow, as shown in fig. 18.
2. Unsolder lead wires from core antenna, as shown in fig. 19.
3. To reassemble, reverse the above procedure.

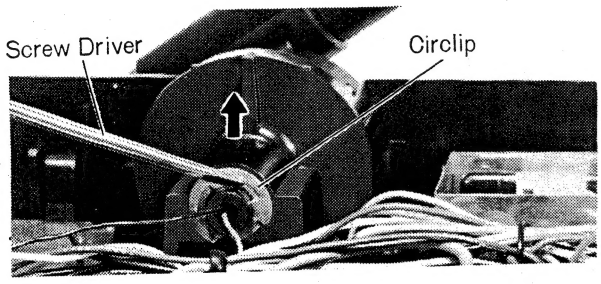


Fig. 17

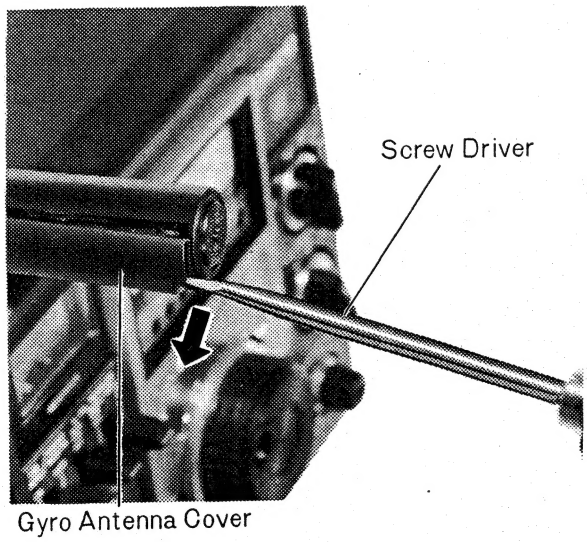


Fig. 18

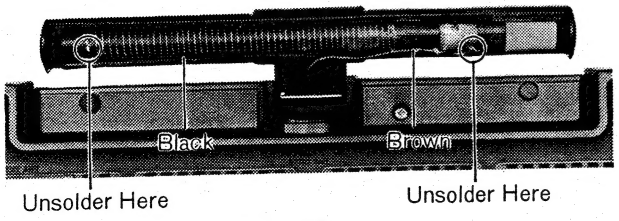


Fig. 19

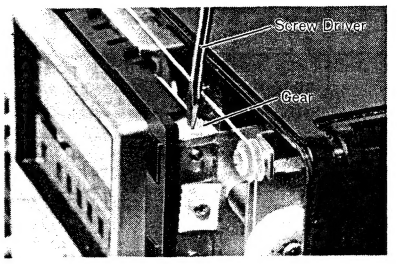


Fig. 12

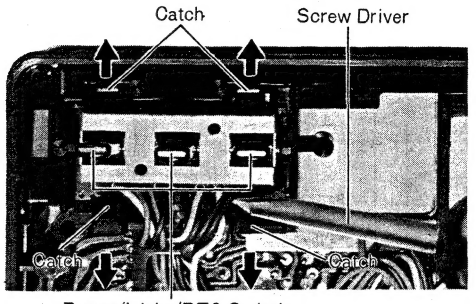


Fig. 13

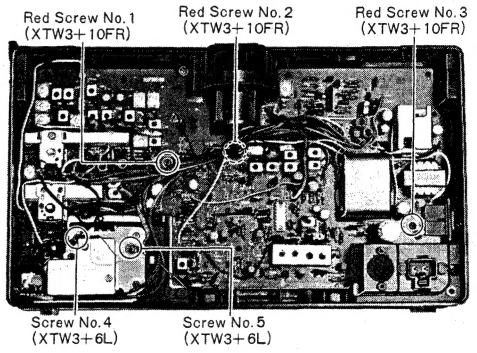


Fig. 14

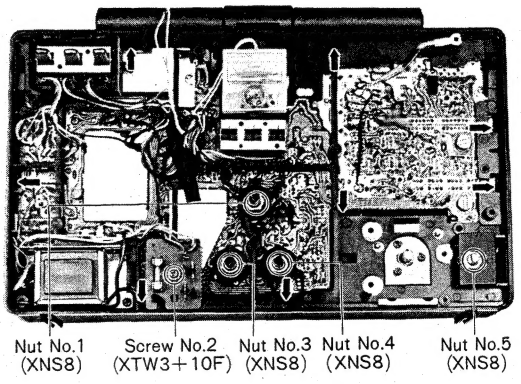


Fig. 15

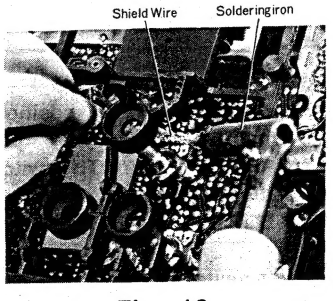
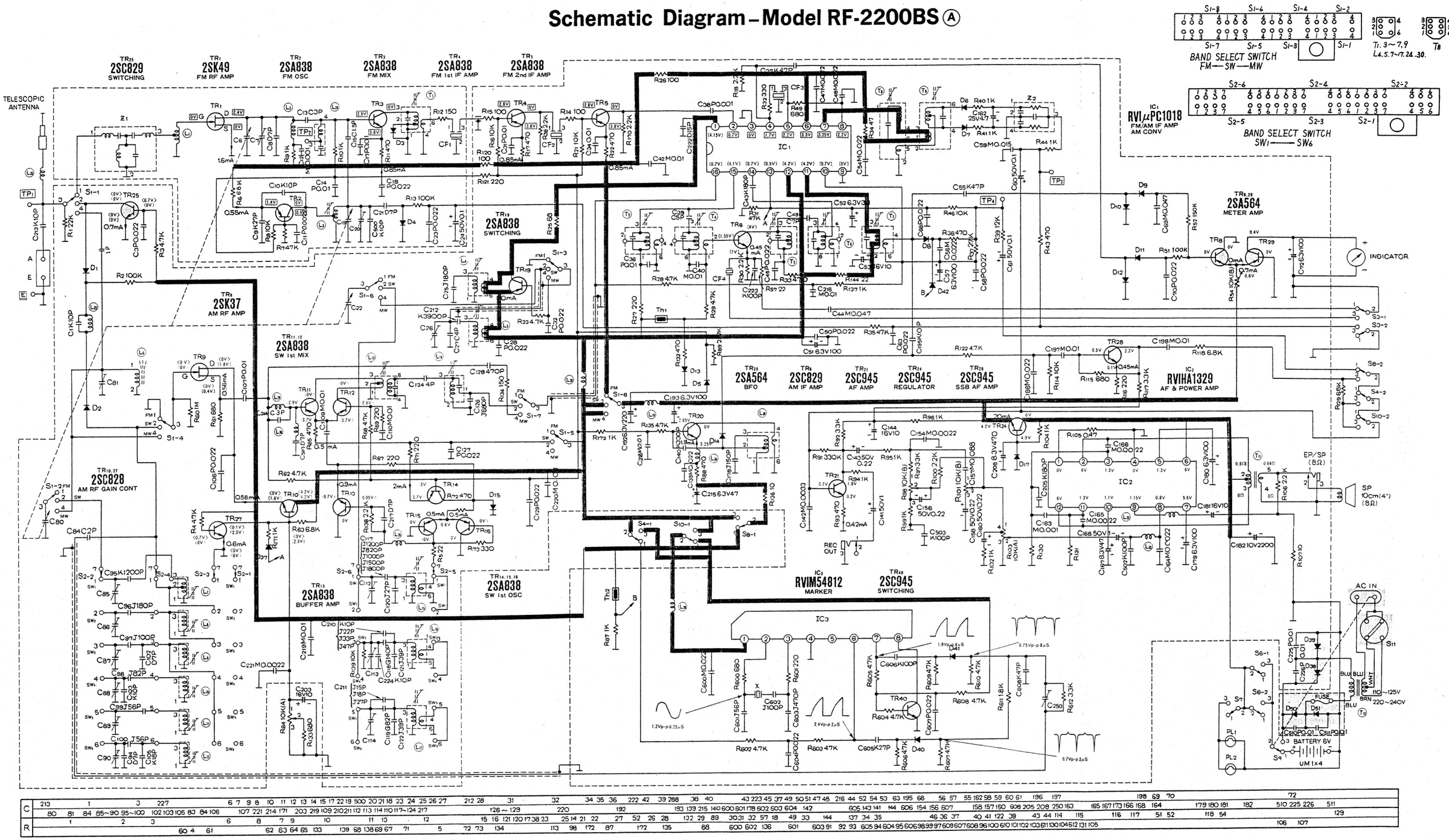


Fig. 16

Schematic Diagram – Model RF-2200BS Ⓐ



Notes:

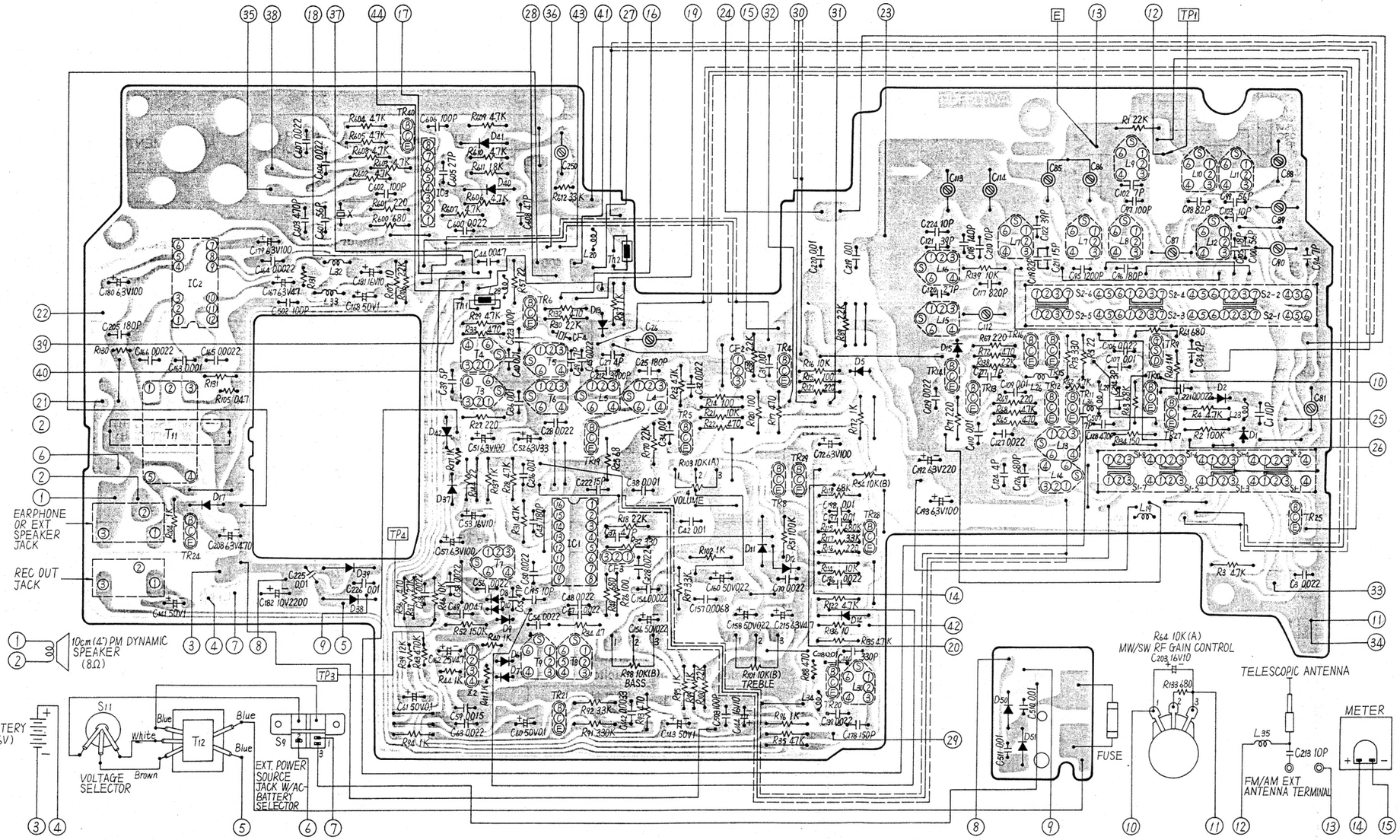
1. S_{1-1}～S_{1-8}: Band switch in "FM" position.
2. S_{2-1}～S_{2-6}: SW band switch in "SW_1" position.
3. S_{3-1}, S_{3-2}: FM AFC/BAND WIDTH switch in "OFF", "NARROW" position.
4. S_{4-1}, S_{4-2}: X-TAL MARKER/125 kHz switch in "OFF" position.
5. S_{6-1}, S_{6-2}: Power switch in "OFF" position.
6. S_7: Dial Light switch in "OFF" position.
7. S_{8-1}, S_{8-2}: BFO switch in "OFF" position.
8. S_9: AC-BATTERY switch in "BATTERY" position.
9. S_{10-1}, S_{10-2}: X-TAL MARKER/500 kHz switch in "OFF" position.
10. S_{11}: Voltage selector in "110～125V" position
11. DC voltage measurements are taken with circuit tester 10kΩ/V from negative side of batteries.
    □...FM position 〔 〕...MW & SW position
    ( )...SW position 〈 〉...CAL-ON position
    TR_{20}...BFO-ON position
12. 1) IC_2 with B rank without R_{130}, R_{131}.
    2) IC_2 with C rank R_{130}, R_{131}.....22 kΩ.
    3) IC_2 with D rank R_{130}, R_{131}.....15 kΩ.
13. Battery current: No signal 60mA
    Maximum output 650mA

IMPORTANT SAFETY NOTICE

THE SHADED AREA ON THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR SAFETY.
WHEN SERVICING IT IS ESSENTIAL THAT ONLY MANUFACTURER'S SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE SHADED AREAS OF THE SCHEMATIC.

$D_{1,2}$	RVDSD113	SWITCHING	$D_{11,12}$	OA90	FM METER RECT
D_3	RVD1K110	FM AGC	D_{14}	RVD1K110	SSB DET
D_4	RVDSD113	FM AFC	D_{15}	RVDVD1252L	AOC
$D_{5,13}$	RVDVD1250M	AOC	D_{17}	RVDMZA205	ZENER
$D_{6,7}$	2-OA90	FM DET	$D_{37,42}$	MA150	SWITCHING
D_8	OA90	AM DET	$D_{38,39,50,51}$	RVD10E1LF	RECT
$D_{9,10}$	OA90	AM METER RECT	$D_{40,41}$	OA90	MARKER

Circuit Board Wiring View–Model RF-2200BS Ⓐ



TR, D & IC	TR24 D17 IC2	D39 D38	TR40 IC3 D42 D37 D8 D10 D9 D6 D7 D40 D41 TR6 TR21 IC1 TR19 D13	TR5	D11 D12 TR8 TR4 TR29 TR20 D14 D5 TR28	TR14 D15 TR13 TR16 TR15 TR12 TR11 D50 D51	TR10 TR9 TR27 D2 D1	D3	TR3	TR2	D4	TR1
T & L	T11 T12	L33 L32	T4 T3 L28 T7 T5 T6 T9 T8 L5	L4	L34 L30	L16 L15 L17 L26 L13 L14 L7 L36 L29 L8 L9 L19	L10 L12 L11 L23 L35	T1	L6	L24	L1	L2 L3

TR1

	FM
S	0 V
G	0 V
D	2.4V
Iᴅ	1.6mA

TR2

	FM
C	0 V
B	0.9V
E	1.4V
Iᴄ	0.55mA

TR3

	FM
C	0 V
B	2.9V
E	3.6V
Iᴇ	0.85mA

TR4

	FM
C	0 V
B	2.8V
E	3.8V
Iᴇ	0.85mA

TR5

	FM
C	0 V
B	2.8V
E	3.8V
Iᴇ	0.85mA

TR6

	MW&SW
C	4 V
B	1.55V
E	1 V
Iᴇ	0.45mA

TR8

C	0 V
B	0 V
E	0.6V
Iᴇ	0mA

TR9

	MW&SW	CAL-ON
S	0.4V	0 V
G	0 V	0 V
D	1.8V	0 V
Iᴅ	0.56mA	0mA

TR10

	MW&SW	CAL-ON
C	4.2V	4.2V
B	2.3V	0 V
E	1.8V	0 V
Iᴇ	0.56mA	0mA

TR11

	SW
C	0 V
B	2.9V
E	3.7V
Iᴇ	0.5mA

TR12

	SW
C	0 V
B	2.9V
E	3.7V
Iᴇ	0.5mA

TR13

	SW
C	0 V
B	0.05V
E	0.7V
Iᴇ	0.9mA

TR14

	SW
C	1 V
B	3 V
E	3.7V
Iᴇ	2mA

TR15

	SW
C	0 V
B	0 V
E	0.6V
Iᴇ	0.5mA

TR16

	SW
C	0 V
B	0 V
E	0.6V
Iᴇ	0.5mA

TR19

C	—
B	—
E	—
Iᴇ	—

TR20

	BFO-ON
C	0 V
B	2.85V
E	3.25V
Iᴇ	1.9mA

TR21

C	1.8V
B	0.7V
E	0.2V
Iᴇ	0.42mA

TR24

C	6 V
B	4.9V
E	4.2V
Iᴇ	20mA

TR25

	SW	CAL-ON
C	0 V	0 V
B	0 V	0.7V
E	0 V	0 V
Iᴇ	0mA	0.7mA

TR27

	SW	CAL-ON
C	2.3V	0.1V
B	0 V	0.7V
E	0 V	0 V
Iᴇ	0mA	0.6mA

TR28

C	2.2V
B	0.5V
E	0.1V
Iᴇ	0.45mA

TR29

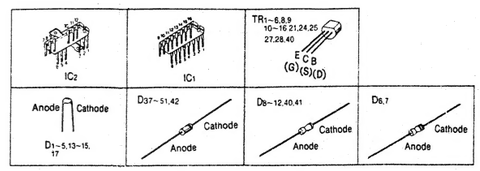
C	0.4V
B	0 V
E	0.6V
Iᴇ	0.75mA

IC1

	FM		MW&SW
2	0.7V	1	4.15V
3	0 V	9	0 V
4	1.7V	10	0.7V
5	2.2V	11	4.2V
6	3.3V	12	4.2V
7	3.25V	13	0.5V
8	2.2V	14	0.7V
		15	4.1V
		16	0.7V

IC2

1	0 V	7	5.6V
2	6 V	8	0.8V
3	1.3V	9	1.15V
4	0 V	10	1.1V
5	1.3V	11	1.3V
6	6 V	12	6 V



■ BLOCK DIAGRAM

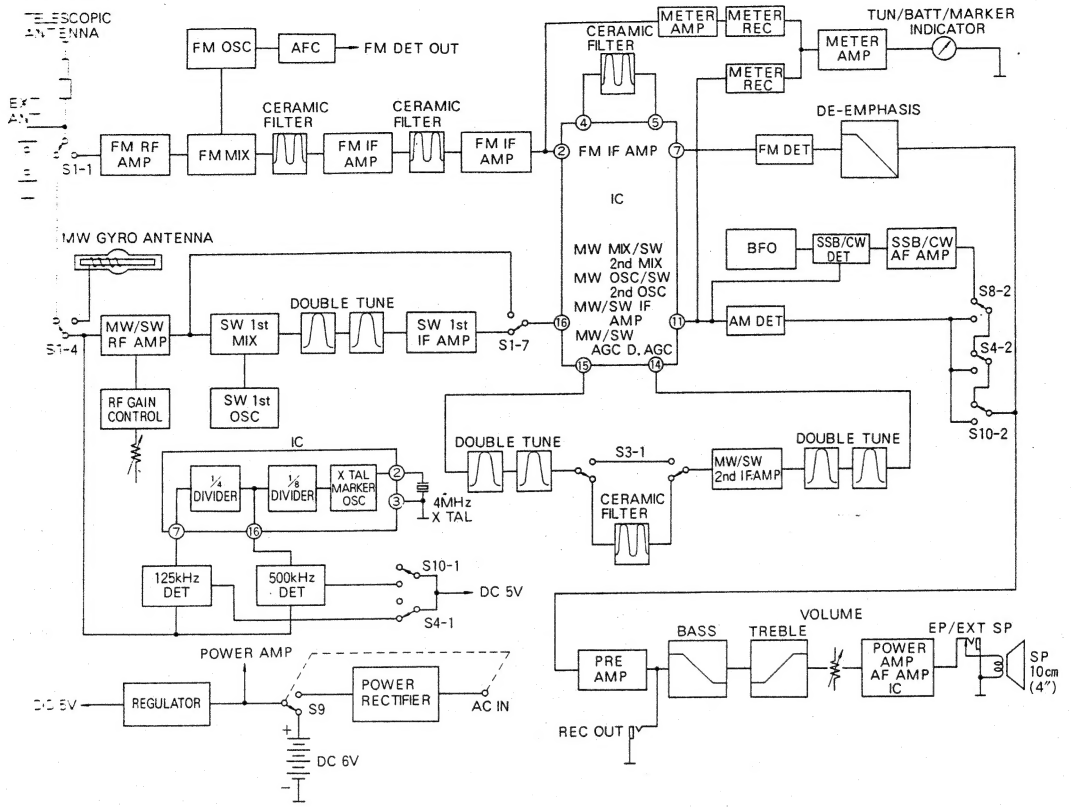


Fig. 20

■ ALIGNMENT POINTS

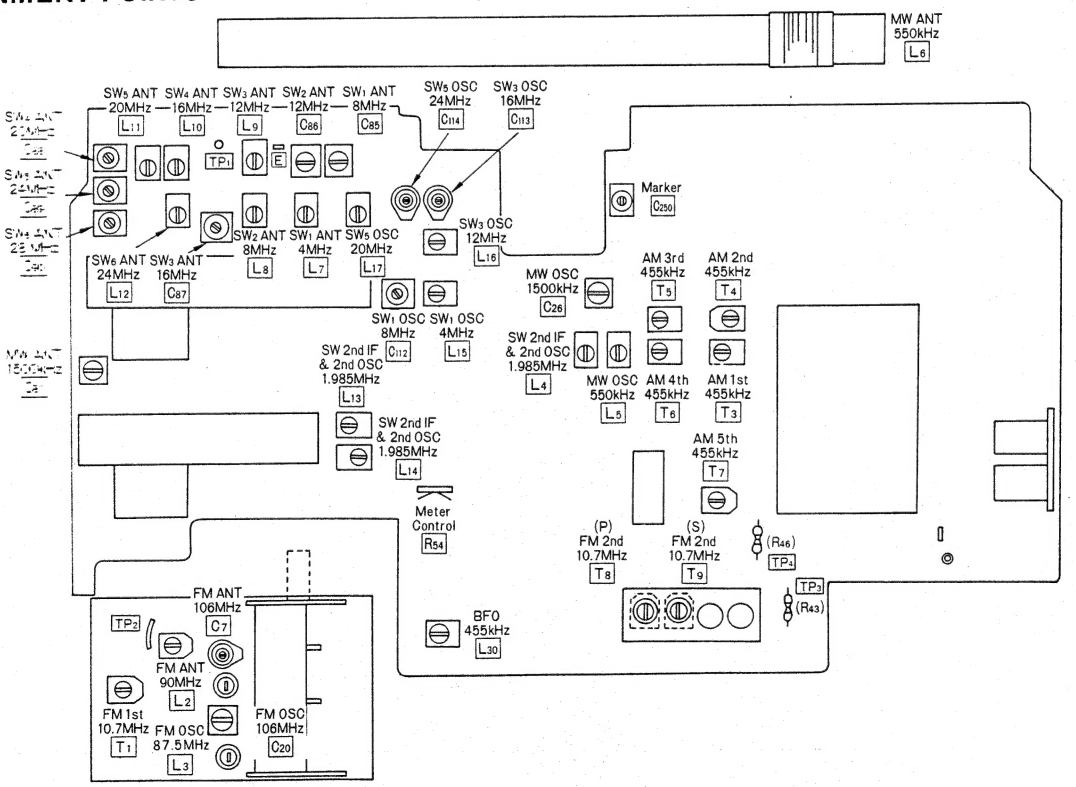


Fig. 21

■ TUNING/BATTERY/MARKER METER ADJUSTMENT

1. RADIO RECEIVER SETTING
   - Set band switch to MW.
   - Set volume control to MIN.
   - Set power source voltage to DC 6V.

2. REMARKS
   - Adjust R_{54} so that the pointer of level meter stays as shown in fig. 22.

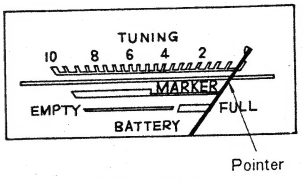


Fig. 22

■ ALIGNMENT INSTRUCTIONS

READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

1. Set volume control to maximum.
2. Set power switch to ON.
3. Set bass and treble control to maximum.
4. Set band switch to MW, SW or FM.
5. Set SW band switch to SW_1, SW_2, SW_3, SW_4, SW_5 or SW_6.
6. Set MW/SW RF gain control to high.
7. Set power source voltage to DC 6V.
8. Set FM AFC/Band width switch to narrow, OFF position for the BFO and FM adjustment, and to wide ON position for other adjustment.
9. Set X-TAL Marker switch to OFF.
10. Set BFO switch to ON position for BFO adjustment, and to OFF position for other adjustment.
11. Output of signal generator should be no higher than necessary to obtain an output reading.

■ MW, SW ALIGNMEMT

	BAND	SIGNAL GENERATOR or SWEEP GENERATOR		RADIO DIAL SETTING	INDICATOR (VTVM or SCOPE)	ADJUSTMENT	REMARKS
		CONNECTIONS	FREQUENCY				
				AM-IF ALIGNMENT			
(1)	MW	Fashion loop of several turns of wire and radiate signal into loop of receiver.	455 kHz 30% Mod. at 400 Hz	Point of non-interference.	Output meter across voice coil.	T_3 (AM 1st IFT) T_4 (AM 2nd IFT) T_5 (AM 3rd IFT) T_6 (AM 4th IFT) T_7 (AM 5th IFT)	1. Set band width switch to narrow and adjust for maximum output. 2. Set band width switch to wide. 3. Adjust for maximum output.
				BFO ALIGNMENT			
(2)	MW	〃	455 kHz	〃	Audio output from speaker.	L_{30} (BFO OSC Coil)	Adjust for zero beat.
				MW-RF ALIGNMENT			
(3)	MW	〃	550 kHz	550 kHz (Refer to fig.29)	Output meter across voice coil	L_5 (MW OSC Coil) L_6 (MW ANT Coil)	Adjust for maximum output.
(4)	MW	〃	1500 kHz	1500 kHz (Refer to fig.30)	〃	C_{26} (MW OSC Trimmer) C_{81} (MW ANT Trimmer)	Adjust for maximum output. Repeat steps (3) and (4).
				SW-1st IF and 2nd OSC ALIGNMENT			
(5)	SW1	Connect to test point TP1 through ceramic capacitor (10PF). Negative side to point E	1.985 MHz	Point of non-interference.	〃	L_4 (2nd OSC Coil) L_{13} (SW 1st IF Coil) L_{14} (SW 1st IF Coil)	Adjust for maximum output.

■ PADDING ALIGNMENT

• When you change variable capacitor please adjust as follows.

1. Solder padding capacitors at the position, as shown in fig. 25 according to the following table.

Ref. No.	Part No.	Description
C_{117} (SW_1)	ECQS05122JZ	1200 PF, 50 WV, ±5%, Styrol
C_{210} (SW_3)	ECMS05270JH	27 PF, 50WV, ±5%, Mica
C_{211} (SW_5)	ECCD1H100KC	10 PF, 50WV, ±10%, Ceramic

2. Adjust the RF circuit of SW_1, SW_3 and SW_5.
3. Set 125 marker switch to ON position and then check zero beat as following frequencies.

Band	Zero Beat Frequency	Radio Dial Setting
SW_1	6 MHz	Turn spread dial two times from 4 MHz position and set it to 0 kHz.
SW_3	14 MHz	Turn spread dial two times from 12 MHz position and set it to 0 kHz.
SW_5	22 MHz	Turn spread dial two times from 20 MHz position and set it to 0 kHz.

4. If there is difference between spread dial indication and the frequency of following table, please change proper capacitor.

Band	Ref. No.	Spread Dial	Part No.	Description
SW_1	C_{117}	less than 960 kHz	ECQS05821JZ	820 PF, 50WV, ±5% Styrol
		960~980 kHz	ECQS05102JZ	1000PF, 50WV, ±5%, Styrol
		20~40 kHz	ECMS05152JZ	1500PF, 50WV, ±5%, Mica
		more than 40 kHz	ECQS05182JZ	1800PF, 50WV, ±5%, Styrol
SW_3	C_{210}	less than 960 kHz	ECCE1H100KC	10PF, 50WV, ±10%, Ceramic
		960~980 kHz	ECMS05220JH	22PF, 50WV, ±5%, Mica
		20~40 kHz	ECMS05330JH	33PF, 50WV, ±5%, Mica
		more than 40 kHz	ECMS05470JH	47PF, 50WV, ±5%, Mica
SW_5	C_{211}	less than 920 kHz	ECCD1H040C	4PF, 50WV, ±0.25PF, Ceramic
		920~960 kHz	ECCD1H070DC	7PF, 50WV, ±0.5PF, Ceramic
		40~80 kHz	ECMS05150JH	15PF, 50WV, ±5%, Mica
		more than 80 kHz	ECMS05180JH	18PF, 50WV, ±5%, Mica

■ SW RF ALIGNMENT

	BAND	SIGNAL GENERATOR or SWEEP GENERATOR		RADIO DIAL SETTING	INDICATOR (VTVM or SCOPE)	ADJUSTMENT	REMARKS
		CONNECTIONS	FREQUENCY				
	SW1-RF ALIGNMENT						
(1)	SW1	Connect to test point TP1 through ceramic capacitor (10PF). Negative side to point E	4 MHz	4 MHz Refer to note 1.	Output meter across voice coil.	L_{15} (SW1 OSC Coil) L_7 (SW1 ANT Coil)	Adjust for maximum output.
(2)	SW1	〃	8 MHz	8 MHz Refer to note 2.	〃	C_{112} (SW1 OSC Trimmer) C_{85} (SW1 ANT Trimmer)	Adjust for maximum output. Repeat steps (1) and (2).
	SW2-RF ALIGNMENT						
(3)	SW2	〃	8 MHz	8 MHz Refer to note 1.	〃	L_8 (SW2 ANT Coil)	Adjust for maximum output.
(4)	SW2	〃	12 MHz	12 MHz Refer to note 2.	〃	C_{86} (SW2 ANT Trimmer)	Adjust for maximum output. Repeat steps (3) and (4).
	SW3-RF ALIGNMENT						
(5)	SW3	〃	12 MHz	12 MHz Refer to note 1.	〃	L_{16} (SW3 OSC Coil) L_9 (SW3 ANT (Coil)	Adjust for maximum output.
(6)	SW3	〃	16 MHz	16 MHz Refer to note 2.	〃	C_{113} (SW3 OSC Trimmer) C_{87} (SW3 ANT Trimmer)	Adjust for maximum output. Repeat steps (5) and (6).
	SW4-RF ALIGNMENT						
(7)	SW4	〃	16 MHz	16 MHz Refer to note 1.	〃	L_{10} (SW4 ANT Coil)	Adjust for maximum output.
(8)	SW4	〃	20 MHz	20 MHz Refer to note 2.	〃	C_{88} (SW4 ANT Trimmer)	Adjust for maximum output. Repeat steps (7) and (8).
	SW5-RF ALIGNMENT						
(9)	SW5	〃	20 MHz	20 MHz Refer to note1.	〃	L_{17} (SW5 OSC Coil) L_{11} (SW5 ANT Coil)	Adjust for maximum output.
(10)	SW5	〃	24 MHz	24 MHz Refer to note 2.	〃	C_{114} (SW6 OSC Trimmer) C_{89} (SW5 ANT Trimmer)	Adjust for maximum output. Repeat steps (9) and (10).
	SW6-RF ALIGNMENT						
(11)	SW6	〃	24 MHz	24 MHz Refer to note 1.	〃	L_{12} (SW6 ANT Coil)	Adjust for maximum output.
(12)	SW6	〃	28 MHz	28 MHz Refer to note 2.	〃	C_{90} (SW6 ANT Trimmer)	Adjust for maximum output. Repeat steps (11) and (12).

Notes:

1. Set tuning capacitor to maximum capacity (minimum frequency), tuning knob to fully counter-clockwise, spread dial to 435 kHz, as shonw in fig. 23. Then set tuning knob to clockwise and set spread dial to 0 kHz, as shown in fig. 24.
2. Set spread dial to 0 kHz by turning 4 times to clockwise from the position of note 1.

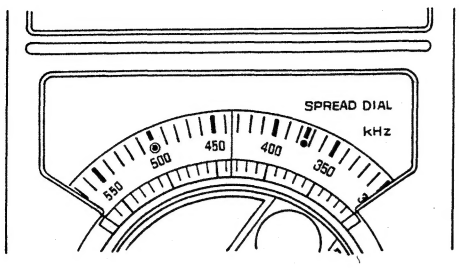


Fig. 23

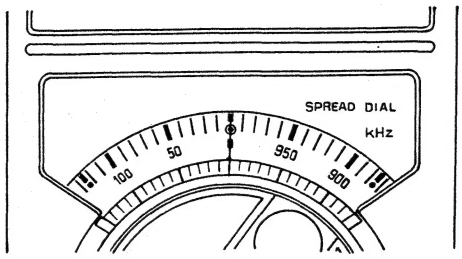


Fig. 24

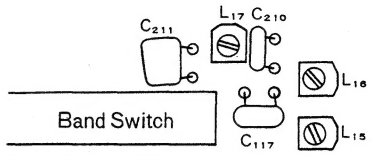


Fig. 25

■ MARKER ALIGNMENT

1. Set trimmer capacitor (C_{250}) to maximum capacity.
2. Check zero beat at the position of 24 MHz (SW_5).
3. Set 125, 500 kHz marker to ON. For the image beat of 24.03 MHz, set spread dial to 24.03 MHz and adjust C_{250} so that the meter indicates 4 scale or less.

■ FM ALIGNMENT INSTRUCTIONS

	SIGNAL GENERATOR or SWEEP GENERATOR		RADIO DIAL SETTING	INDICATOR (VTVM or SCOPE)	ADJUSTMENT	REMARKS
	CONNECTIONS	FREQUENCY				
	FM-IF ALIGNMENT					
(1)	High side thru. 0.001μF to point TP2. Negative side to point E.	10.7 MHz (400 kHz SWP.)	Point of non-interference. (on/about 90 MHz).	Connect vert. amp. of scope to point TP3, Negative side to point E.	T_1 (FM 1st IFT) T_8 (FM 2nd IFT) (Primary)	Adjust for maximum amplitude. (Refer to fig. 26).
(2)	〃	〃	〃	〃	T_9 (FM 2nd IFT) (Secondary)	Adjust for maximum amplitude. (Refer to fig. 27).
	FM-RF ALIGNMENT					
(3)	Connect to test point TP1 through FM dummy antenna. Negative side to point E. (Refer to fig. 28).	87.5 MHz	Variable capacitor fully closed.	Output meter across voice coil.	L_3 (FM OSC Coil)	Adjust for maximum output.
(4)	〃	90 MHz	90 MHz (Refer to fig. 31)	〃	L_2 (FM Tuning Coil)	Adjust for maximum output.
(5)	〃	106 MHz	106 MHz (Refer to fig. 32)	〃	C_{20} (FM OSC Trimmer) C_7 (FM ANT Trimmer)	Adjust for maximum output. Repeat steps (3) and (4).

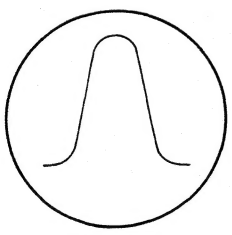


Fig. 26

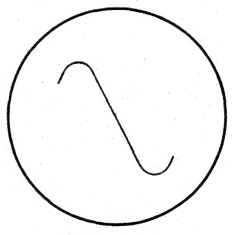


Fig. 27

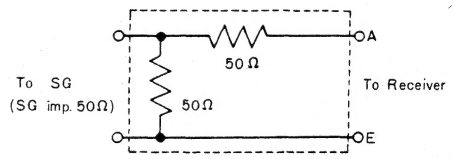


Fig. 28 FM Dummy Antenna

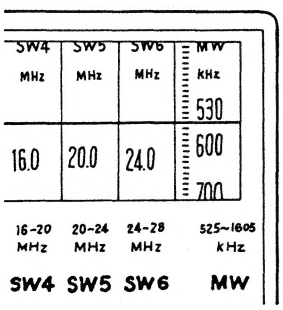


Fig. 29 550 kHz (MW)

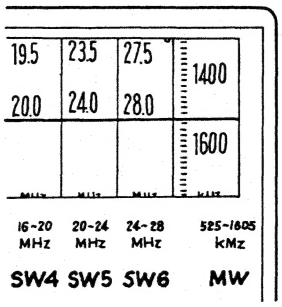


Fig. 30 1500 kHz

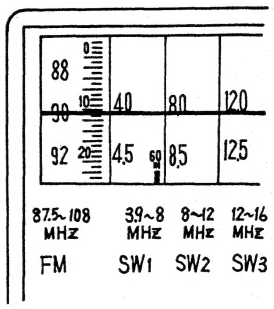


Fig. 31 90 MHz (FM)

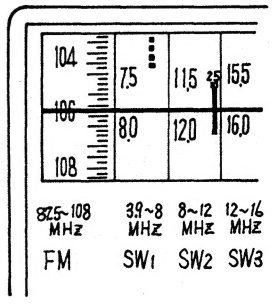


Fig. 32 106 MHz

CABINET PARTS LOCATION

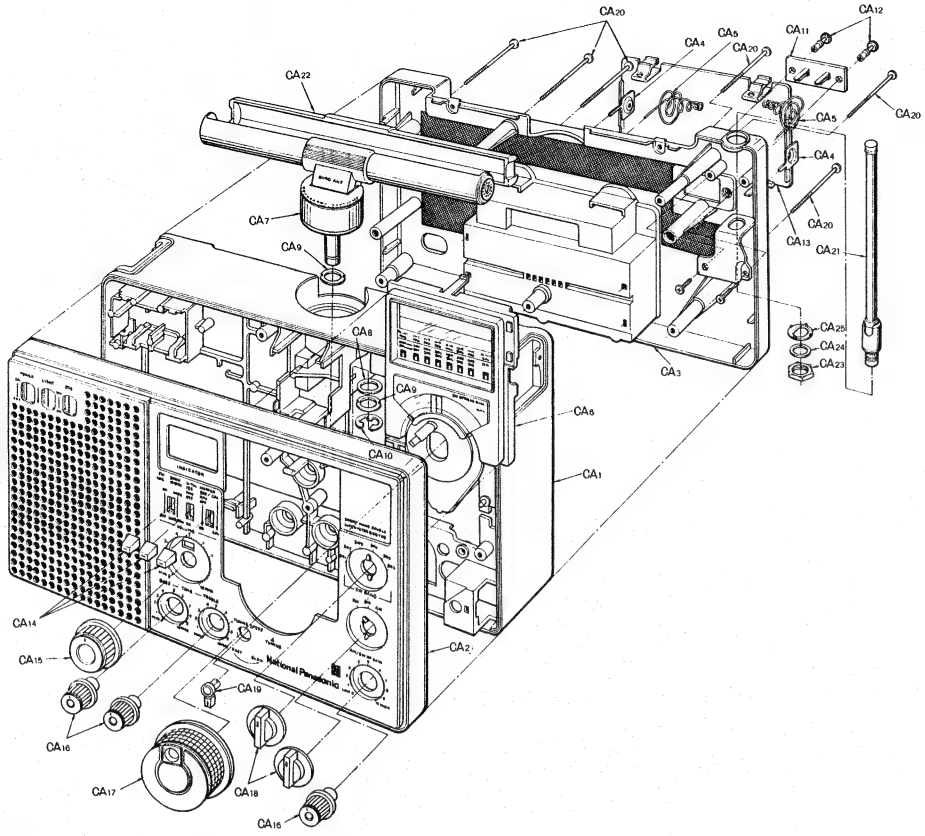


Fig. 33

PACKING MATERIALS AND ACCESSORIES

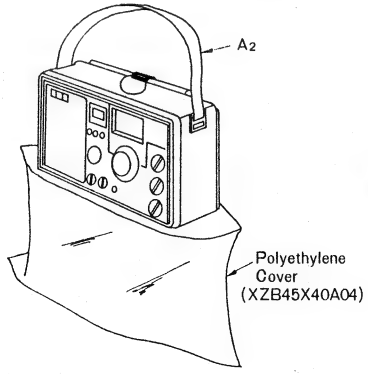


Fig. 34

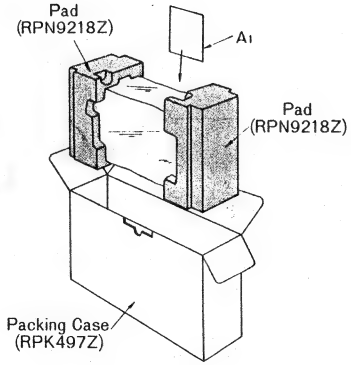


Fig. 35

CHASSIS PARTS LOCATIONS

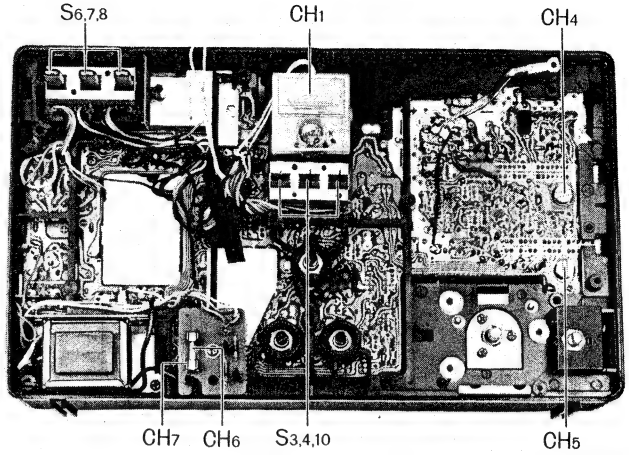


Fig. 36

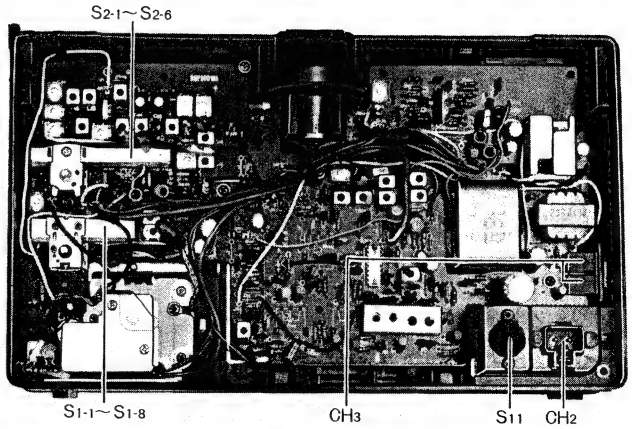


Fig. 37

■ DIAL DRIVE ASSEMBLY PARTS LOCATIONS

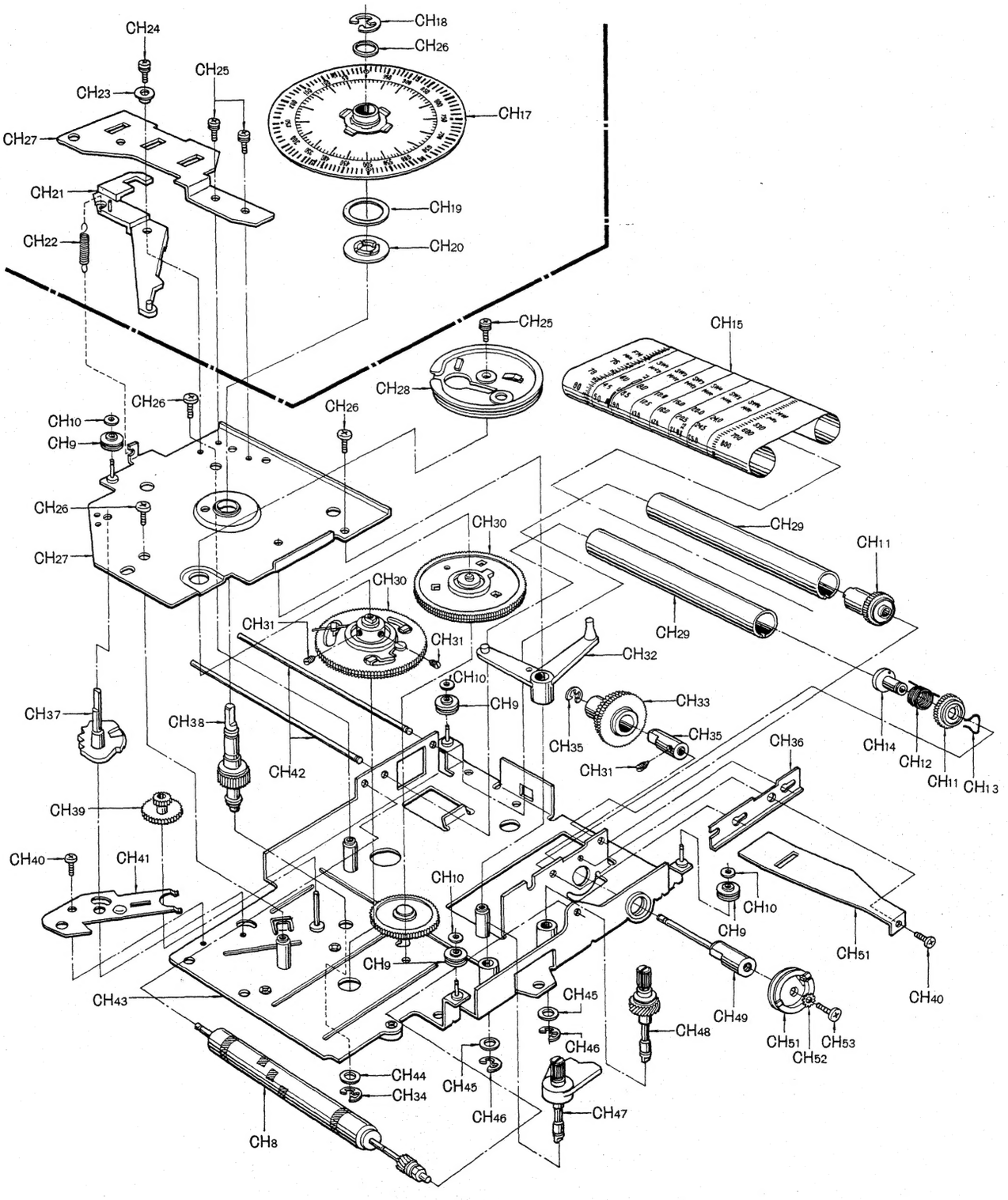


Fig. 38

Ref. No.	Part No.	Part Name & Description	Per Set		Remarks
		SPEAKER			
SP	EAS10P57SA	Speaker, Imp.8Ω, PM Dynamic	1		X
		SWITCHES			
S1-1~S1-8	RSR3H02Z-H	Switch, Band	1		X
S2-1~S2-6	RSR6F01Z-P	Switch, SW Band	1		X
S3,4,10	RSTX003Z-A	Switch, FM AFC, X-TAL MARKER	1		X
S6,7,8	RSTX002Z-M	Switch, Power, Light, BFO	1		X
S11	RSR2A01Z-H	Switch, Voltage Selector	1		X
		RESISTORS			
R27,67,69,71, 116,121,601	**ERD25TJ221**	220Ω, 2/5Watt, ±5%, Carbon	7		Z
R11,17,22,33, 36,65,72,88, 93,132	**ERD25TJ471**	470Ω, 2/5Watt, ±5%, Carbon	10		Z
R49,61,600	**ERD25TJ681**	680Ω, 2/5Watt, ±5%, Carbon	3		Z
R14,15,26, 120	**ERD25TJ101**	100Ω, 2/5Watt, ±5%, Carbon	4		Z
R9,10,40,41, 44,87,94,95, 96,99,102, 104,137,171 172	**ERD25TJ102**	1KΩ, 2/5Watt, ±5%, Carbon	15		Z
R3,4,7,23,28, 29,62,68, 122,135,602 603,604,605	**ERD25TJ472**	4.7KΩ, 2/5Watt, ±5%, Carbon	14		Z
R8,16,21,46, 114,139	**ERD25TJ103**	10KΩ, 2/5Watt, ±5%, Carbon	6		Z
R130,131	**ERD25TJ153**	15KΩ, 2/5Watt, ±5%, Carbon	2		Z
R1,130,131	**ERD25TJ223**	22KΩ, 2/5Watt, ±5%, Carbon	3		Z
R31,35	**ERD25TJ473**	47KΩ, 2/5Watt, ±5%, Carbon	2		Z
R107,136	**ERD25TJ100**	10Ω, 2/5Watt, ±5%, Carbon	2		Z
R5,57,144	**ERD25TJ220**	22Ω, 2/5Watt, ±5%, Carbon	3		Z
R34	**ERD25TJ470**	47Ω, 2/5Watt, ±5%, Carbon	1		Z
R25	**ERD25TJ680**	68Ω, 2/5Watt, ±5%, Carbon	1		Z
R12,134	**ERD25TJ151**	150Ω, 2/5Watt, ±5%, Carbon	2		Z
R32,73	**ERD25TJ331**	330Ω, 2/5Watt, ±5%, Carbon	2		Z
R18,30,38,89, 100,106,138 170	**ERD25TJ222**	2.2KΩ, 2/5Watt, ±5%, Carbon	8		Z
R37	**ERD25TJ272**	2.7KΩ, 2/5Watt, ±5%, Carbon	1		Z
R92,97,117, 612	**ERD25TJ332**	3.3KΩ, 2/5Watt, ±5%, Carbon	4		Z
R6,63,118	**ERD25TJ682**	6.8KΩ, 2/5Watt, ±5%, Carbon	3		Z
R129	**ERD25TJ683**	68KΩ, 2/5Watt, ±5%, Carbon	1		Z
R39	**ERD25TJ123**	12KΩ, 2/5Watt, ±5%, Carbon	1		Z
R52	**ERD25TJ154**	150KΩ, 2/5Watt, ±5%, Carbon	1		Z
R2,13,51	**ERD25TJ104**	100KΩ, 2/5Watt, ±5%, Carbon	3		Z
R91	**ERD25TJ334**	330KΩ, 2/5Watt, ±5%, Carbon	1		Z
R43	**ERD25TJ474**	470KΩ, 2/5Watt, ±5%, Carbon	1		Z
R115	**ERD25TJ684**	680KΩ, 2/5Watt, ±5%, Carbon	1		Z

Ref. No.	Part No.	Part Name & Description	Per Set		Remarks
R60	**ERD25TJ105**	1MΩ, 2/5Watt, ±5%, Carbon	1		Z
R105	**ERX1ANJR47U**	0.47Ω, 1Watt, ±5%, Metal Oxide	1		Z
R133	**ERD25TJ681**	680Ω, 2/5Watt, ±5%, Carbon	1		Z
R611	**ERD25TJ182**	1.8KΩ, 2/5Watt, ±5%, Carbon	1		Z
		CAPACITORS			
C15	ECCD1H1R5C	1.5PF, 50WV,±0.25PF,Ceramic	1		Z
C84	ECCD1H020C	2PF, 50WV,±0.25PF,Ceramic	1		Z
C13,214	ECCD1H030C	3PF, 50WV,±0.25PF,Ceramic	2		Z
C124,211	ECCD1H040C	4PF, 50WV,±0.25PF,Ceramic	2		Z
C27,39	ECCD1H050CC	5PF, 50WV,±0.25PF,Ceramic	2		Z
C8,21,49,94, 102,217,507	ECCD1H070DC	7PF, 50WV,±0.5PF, Ceramic	7		Z
C1,103,110, 195,213,500	ECCD1H100KC	10PF, 50WV,±10%, Ceramic	6		Z
C10,222	ECCD1H150KC	15PF, 50WV,±10%, Ceramic	2		Z
C105	ECCD1H180KC	18PF, 50WV,±10%, Ceramic	1		Z
C9,152,605	ECCD1H270KC	27PF, 50WV,±10%, Ceramic	3		Z
C37,55,608	ECCD1H470KC	47PF, 50WV,±10%, Ceramic	3		Z
C38	ECKD1H102ZF	0.001μF, 50WV,+80 -20%, Ceramic	1		Z
C210,223,502 503,606	ECCD1H101K	100PF, 50WV,±10%, Ceramic	5		Z
C43,205	ECCD1H181K	180PF, 50WV,±10%, Ceramic	2		Z
C140	ECKV1H331KB	330PF, 50WV,±10%, Ceramic	1		Z
C122	ECCD1H390JU	39PF, 50WV,±5%, Ceramic	1		Z
C11,14,17, 107,225,510 511	ECKV1H103ZF	0.01μF, 50WV,+80 -20%, Ceramic	7		Z
C31,34,36, 226	ECKT1H103ZF	0.01μF, 50WV,+80 -20%, Ceramic	4		Z
C18,23,32,45, 68,127	ECKV1H223ZF	0.022μF, 50WV,+80 -20%, Ceramic	6		Z
C3,28,50,58, 63,70,106, 129,604,607	ECKT1H223ZF	0.022μF, 50WV,+80 -20%, Ceramic	9		Z
C128	ECKD1H471MD	470PF, 50WV,±20%, Ceramic	1		Z
C12,163	ECKD1H102MD	0.001μF, 50WV,±20%, Ceramic	2		Z
C11,154,165, 166,164,221	ECKD1H222MD	0.0022μF, 50WV,±20%, Ceramic	6		Z
C142	ECKD1H332MD	0.0033μF, 50WV,±20%, Ceramic	1		Z
C157	ECKD1H682MD	0.0068μF, 50WV,±20%, Ceramic	1		Z
C40,42,109, 110,197,198 216,218,219 220	ECKD1H103MD	0.01μF, 50WV,±20%, Ceramic	10		Z
C120	ECMS05270JH	27PF, 50WV,±5%, Mica	1		Z
C121	ECMS05390JH	39PF, 50WV,±5%, Mica	1		Z
C99,100,601	ECMS05560JH	56PF, 50WV,±5%, Mica	3		Z
C98	ECMS05820JH	82PF, 50WV,±5%, Mica	1		Z
C97,602	ECMS05101JH	100PF, 50WV,±5%, Mica	2		Z
C25,96	ECMS05181JH	180PF, 50WV,±5%, Mica	2		Z
C119	ECMS05820GH	82PF, 50WV,±2%, Mica	1		Z
C118	ECMS05141GH	140PF, 50WV,±2%, Mica	1		Z
C211	ECMS05120JH	12PF, 50WV,±5%, Mica	1		Z
C126	ECQS05102JZ	1000PF, 50WV,±5%, Styrol	1		Z

■REPLACEMENT PARTS LIST·····Model RF-2200BSⒶ

(RD7703-1452)

NOTES: 1.Part numbers are indicated on most mechanical parts.
Please use this part number for parts orders.
2.X−Z rank: X rank parts will cover 80% of repair needs.
X+Y rank parts will cover 95% of repair needs.
Z rank parts are less necessary.
3.Components identified by shaded area have special characteristic important for safety. When replacing any of these components use only manufacturer's special parts.
4.Part numbers shown in bold letters are service standard parts and may differ from production parts.
5.The ○ mark is used by the manufacturing plant only.

Ref. No.	Part No.	Part Name & Description	Per Set		Remarks
INTEGRATED CIRCUITS, TRANSISTORS AND DIODES					
IC1	RVIμPC1018	IC, FM/AM IF AMP., AM Converter	1		X
IC2	RVIHA1329	IC, AF & Power Amp.	1		X
IC3	RVIM54812	IC, Marker	1		○X
TR1	2SK49	Transistor(Si), FM RF Amp.	1		X
TR2,3,4,5,11, 12,13,14, 15,16,19	2SA838	Transistor(Ge), FM OSC, FM MIX, FM IF AMP., SW MIX, Buffer Amp., SW OSC, Switching	11		X
TR6,25	2SC829	Transistor(Si), AM IF Amp., Switching	2		X
TR8,20,29	2SA564	Transistor(Ge), Meter AMP., BFO	3		X
TR9	2SK104	Transistor(Si), AM RF AMP.	1		○X
TR10,27	2SC828	Transistor(Si), AM RF Gain Control	2		X
TR21,24,28, 40	2SC945	Transistor(Si), AF Amp., Regulator, SSB AF Amp., Switching	4		X
D1,2,4	RVDSD113	Diode(Si), FM AGC, Switching	3		X
D3,14	RVD1K110	Diode(Si), FM AGC, SSB Det.	2		X
D5,13	RVDVD1250M	Diode(Si), Operation Compensator	2		X
D6,7	2-OA90	Diode(Ge), FM Detector	2		X
D8,9,10,11,12 40,41	OA90	Diode(Ge), Detector, AM Meter Rect. Marker	7		X
D15	RVDVD1252L	Diode(Si), Operation Compensator	1		X
D17	RVDMZA205	Diode(Si), Zener	1		X
D37,42	MA150	Diode(Si), Switching	2		X
D38,39,50,51	RVD10E1LF	Diode(Si), Rectifier	4		X
CRYSTAL AND THERMISTORS					
X1	RVCX4000Q5Z	Crystal	1		X
Th1,2	RRT262	Temperature Compensator	2		X
CERAMIC FILTERS, COILS AND TRANSFORMERS					
CF1,2,3	RVF107MFR	Ceramic Filter	3		X
CF4	RVFBFB455C1	Ceramic Filter	1		X
L1	RLA4Y6	Antenna Coil, FM	1		X

Ref. No.	Part No.	Part Name & Description	Per Set		Remarks
L2	RLD4N33	Coil, Tuning	1		X
L3	RLO4N95	Oscillator Coil, FM(RLO4N27-O)	1		X
L4	RLO9M4	Oscillator Coil, 2nd Local	1		X
L5	RLO2M16	Oscillator Coil, MW	1		X
L6	RLF2G38	Antenna Coil, MW	1		X
L7	RLA3M19	Antenna Coil, SW1	1		X
L8	RLA3M20	Antenna Coil, SW2	1		X
L9	RLA3M21	Antenna Coil, SW3	1		X
L10	RLA3M22	Antenna Coil, SW4	1		X
L11	RLA3M23	Antenna Coil, SW5	1		X
L12	RLA3M24	Antenna Coil, SW6	1		X
L13	RLI9M3	IFT, SW 2nd IF	1		X
L14	RLI9M4	IFT, SW 2nd IF	1		X
L15	RLO3M37	Oscillator Coil, SW1	1		X
L16	RLO3M38	Oscillator Coil, SW3	1		X
L17	RLO3M39	Oscillator Coil, SW5,6	1		X
L24	RLI4M103	Coil, IF Trap	1		X
L30	RLO9M5	Oscillator Coil, BFO	1		X
T1	RLI4M101	IFT, FM 1st	1		X
T3,5	RLI2M212	IFT, AM 1st, 3rd(RLI2M212-K)	2		X
T4,6	RLI2M208	IFT, AM 2nd, 4th	2		X
T7	RLI2M402	IFT, AM 5th	1		X
T8	RLI4M504	IFT, FM 2nd(Primary)	1		X
T9	RLI4M506	IFT, FM 2nd(Secondary)	1		X
T11	RLT2H32	Output Transformer, P=20Ω:S=8Ω (RLT2H32-V, RLT2H32-W)	1		X
T12	RLT5J199	Power Transformer	1		X
VARIABLE RESISTORS					
R64	EVHCMA095A14	10KΩ(A), RF Gain Control	1		X
R103	EVH8XAF25A14	10KΩ(A), Volume Control	1		X
R98,101	EVH7XAF25B14	10KΩ(B), Tone Control	2		X
R54	**EVLTOAA00B14**	10KΩ(B), Pre Set, Meter Control	1		Y
VARIABLE CAPACITORS					
C6,9,22,80	RCVCV45D112	Tuning Capacitor	1		Y
C85,86	RCVCTY21D17	Trimmer Capacitor	1		Y
C20,26,81, 250	RCV1PX15AG	Trimmer Capacitor	4		Y
C87,88,89,90	RCV1PX20AG	Trimmer Capacitor	4		Y
C112,113,114	RCV1PX30AG	Trimmer Capacitor	3		Y
C7	ECV1ZW10×32	Trimmer Capacitor	1		Y
COMPONENT COMBINATIONS					
Z1	RXABPF10801H	Component Combination, Coils & Capacitors	1		Y
Z2	EXA5DL04C	Component Combination, 330PF×3, 4.7KΩ×2	1		Y

Ref. No.	Part No.	Part Name & Description	Per Set		Remarks
C95	ECQS05122KZ	1200PF, 50WV,±10%, Styrol	1		Z
C212	ECQS05392KZ	3900PF, 50WV,±10%, Styrol	1		Z
C178	ECQS1151JZ	150PF, 50WV,±5%, Styrol	1		Z
C117	ECQS05821JZ	820PF, 50WV,±5%, Styrol	1		Z
C59	ECFVD153MD	0.015μF, 50WV,±20%, Semi-Conductor	1		Z
C47,54,56, 196,228	ECFVD223MD	0.022μF, 50WV,±20%, Semi-Conductor	5		Z
C44	ECFTD473MD	0.047μF, 50WV,±20%, Semi-Conductor	1		Z
C69	ECFVD473MD	0.047μF, 50WV,±20%, Semi-Conductor	1		Z
C48,139,600	ECFTD223MD	0.022μF, 50WV,±20%, Semi-Conductor	3		Z
C52	**ECEA16V33**	33μF, 16WV, Electrolytic	1		Y
C167,215	**ECEA16V47**	47μF, 16WV, Electrolytic	2		Y
C51,57,72, 179,180,193	**ECEA10V100**	100μF, 10WV, Electrolytic	6		Y
C208	**ECEA6V470**	470μF, 6.3WV, Electrolytic	1		Y
C192	**ECEA6V220**	220μF, 6.3WV, Electrolytic	1		Y
C603	ECQS05471JZ	470PF, 50WV,±5%, Ceramic	1		Z
C182	**ECEA10V2200**	2200μF, 10WV, Electrolytic	1		Y
C53,144,181, 203	**ECEA16V10**	10μF, 16WV, Electrolytic	4		Y
C162	**ECEA35V4R7B**	4.7μF, 35WV, Electrolytic	1		Y
C24,60,61	**ECEA50ZR1E**	1μF, 50WV, Electrolytic	3		Y
C143,156,158 160	**ECEA50ZR22**	0.22μF, 50WV, Electrolytic	4		Y
C141,168	**ECEA50V1**	1μF, 50WV, Electrolytic	2		Y
		CABINET			
CA1	RYMF2200BSXG	Cabinet Assembly	1		X
CA2	RYF1F2200BSX	Cabinet Cover Assembly(Front)	1		X
CA3	RYF2F2200BSA	Cabinet Cover Assembly(Rear)	1		○X
CA4	RJC111A	Terminal, Battery ⊕ Side	2		Y
CA5	RJC505Z	Terminal Spring, Battery ⊖ Side	2		Y
CA6	RYPF2200BSXG	Front Panel Assembly	1		X
CA7	RYEF2200N	Gyro Antenna Case Assembly	1		X
CA8	RUS238Z	Spring, Gyro Antenna	1		Z
CA9	RHE6021Z	Washer, Gyro Antenna	3		Z
CA10	XUC9FY	Circlip, Gyro Antenna	1		Z
CA11	RJF1044Z	Terminal, EXT. Antenna	1		Y
CA12	SHRA403	Latch, EXT. Antenna Terminal M'tg	2		Z
CA13	RKK114Z	Cover, Battery Compartment	1		Y
CA14	RBE13Z	Knob, FM AFC, BAND WIDTH	3		X
CA15	RBN379Z	Knob, Volume	1		X
CA16	RBN381Z	Knob, Bass, Treble, RF Gain	3		X
CA17	RBN380Z	Knob, Tuning	1		X
CA18	RBS103ZK	Knob, Band	2		X
CA19	RBS104Z	Knob, Tuning Speed	1		X
CA20	XTB3+50CFN	Screw, Cabinet Back Cover M'tg	6		Z
CA21	**XEART160GDY**	Telescopic Antenna, 7 Steps, 963mm	1		X
CA22	RKE140Z	Cover, Core Antenna	1		Y

Ref. No.	Part No.	Part Name & Description	Per Set		Remarks
		CHASSIS			
	XAMR46T200	Pilot Lamp, Dial & Meter, 6V, 40mA	2		X
CH1	RSM2614Z-K	Meter, Tune, Battery, Marker	1		X
CH2	RJJ30Z-H	Jack, EXT. Power Source	1		Y
CH3	RJJ80A-C	Jack, Earphone & Rec. Out	1		Y
	RUS279Z	Spring, Band Switch Shaft	2		Z
	RNW423Z	Washer, Band Switch Shaft	2		Z
CH4	RHM71Z	Shaft, SW Band Switch	1		Z
CH5	RHM69Z	Shaft, Band Switch	1		Z
	RJE10Z	Cover, EXT. Power Source Jack	1		Y
CH6	XBA2C08TRO	Fuse, 250V, 800mA	1		X
CH7	**RJF7A**	Holder, Fuse	2		X
	XTW3+10FR	Red Screw, P.C. Board M'tg	3		Z
	RXEF2200BSXG	Dial Drive Assembly	1		X
CH8	RXE6F2200N	Selector, Drum Assembly	1		X
CH9	RDR20-3	Pulley, Dial	4		Z
CH10	RNW150-2	Washer, Dial	4		Z
CH11	RDG5649Z	Gear, Roller	1		Z
CH12	RDS5050Z	Spring, Gear	1		Z
CH13	RUS273Z	Spring, Gear	1		Z
CH14	RDE88Z	Shaft, Gear	1		Z
CH15	RKD423Y	Scale, Dial	1		Y
CH16(Fig.9)	RDZ05Z	Cord(500m), Dial	1Roll		Z
CH17	RXE11F2200N	Spread Dial Assembly	1		X
CH18	XUC6FW	Circlip, Spread Dial M'tg	1		Z
CH19	RUS283Z	Spring, Spread Dial M'tg	1		Z
CH20	RDE99Z	Washer, Tuning Shaft M'tg	1		Z
CH21	RUB145Z	Lever, Calibrator	1		Z
CH22	RDS3120A	Spring, Calibrator Lever	1		Z
CH23	RHM68Z	Spacer, Calibrator Lever	1		Z
		ACCESSORIES			
	XEH1A1-P	Magnetic Earphone	1		Y
	RJA20Z-K	Power Cord, AC	1		Y
A1	RQX6071Z	Instruction Book	1		Y
A2	RQC9011Z	Belt	1		Y